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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/580,945

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Gary Burns

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EXAMINER

LIAO, DIANA J

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

09/04/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents.admin@dowcorning.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/580,945	<b>Applicant(s)</b> BURNS ET AL.	
	<b>Examiner</b> DIANA J. LIAO	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☒ Claim(s) 4-11 (for being multiple dependent claims) is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/30/2006</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Priority***

1. Claim for priority is acknowledged to PCT/US04/27846 filed on 8/27/2004, which claims benefit to US provisional application 60/527,120 filed on 12/4/2003.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 5/30/2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Objections***

3. Claims 4-11 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot further depend from any multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims 4-11 have not been further treated on the merits.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1793

5. Claims 5-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "the treatment atmosphere" in the middle of the claim. There is insufficient antecedent basis for this limitation in the claim, as a treatment atmosphere has not been established in the claim.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ingle, et al. (US 4,172,883), in view of Pelosini, et al. (US 4,241,037), optionally in view of Sanjurjo, et al. (US 4,612,179).

Art Unit: 1793

Ingle '883 teaches a method of purifying metallurgical grade silicon comprising putting chunks of silicon containing impurities consisting of aluminum and boron. The silicon is heated to a temperature of 800 to 1350°C in vacuo. The chunks are then subjected to a reactant gas at 0.1 torr to atmospheric pressure. (claim 1) The chunks are within a range of 0.1-10mm, and the reactant gas is passed over the chunks for a period of 4-20 hours. (claim 2)

The range of the sizes of the particles of silicon purified, the temperature to which the silicon is heated and as the pressure at which they are treated overlap with those of the instant claims. It would have been obvious to one of ordinary skill in the art to optimize these general conditions to achieve better purification. In addition an overlap of ranges is found to be a prima facie case of obviousness.

Ingle '883 does not teach the removal of phosphorus.

Pelosini '037 teaches a process of purifying silicon, reducing the phosphorous content among other impurities. (claim 1) Pelosini '037 teaches that metallurgical silicon generally contains impurities, such as boron, aluminum, and phosphorous. (col 2, lines 19-25) These impurities are detrimental for use as solar grade silicon. (col 1, lines 49-54)

Regarding the removal of phosphorus, Pelosini '037 teaches that metallurgical silicon normally contains phosphorus and that it is an undesired impurity. Ingle '883

Art Unit: 1793

teaches the goal of creating a silicon of sufficient purity for solar cell applications. (col 1, lines 23-30) Pelosini '037 teaches that metallurgical silicon contains many impurities undesired in the solar cell art, including phosphorus, which would otherwise cause the silicon to be unsuitable for solar applications. Since the process steps taught in Ingle '883 are substantially similar to that of the claimed process, the process must inherently remove phosphorus. It would have been obvious to one of ordinary skill in the art to remove all impurities possible, and adjusting the parameters as necessary, including pressure and time.

Optionally, regarding particle size, Sanjurjo '179 teaches a process for purifying silicon comprising heating the silicon to below melting temperature, contacting it with a purifying agent, and causing the impurities to enter the purifying material. (claim 1) In other words, as the impurities enter the purifying material, they are leaving the silicon. The process is carried at a temperature of 1350-1410°C most preferably, and the silicon should be less than 1 mm. (claims 3 and 4) Sanjurjo '179 teaches that the silicon is preferably crushed to a small particle size of smaller than 0.1mm to 1mm at least in one direction, in order to expose more grain boundaries of the silicon, where much of the impurities of the silicon are concentrated. (col 3, lines 22-28)

Regarding the silicon particle sizes outside of the overlapping claimed range and range of Ingle '883, Sanjurjo '179 offers teachings that suggest that smaller particles sizes will be advantageous for purification. Since the grinding of silicon will better expose grain boundaries and thus impurities in silicon, it would have been obvious to

Art Unit: 1793

one of ordinary skill in the art to grind the silicon down to a smaller size in order to facilitate impurity removal.

Therefore, due to optimization from one of ordinary skill in the art, the ranges of the conditions, the size of the particles, and the heating schemes for the silicon particles are not found patentable over the prior art.

### ***Conclusion***

Claims 1-3 have been rejected. Claims 4-11 have not been examined on the merits. No claims have been allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANA J. LIAO whose telephone number is (571)270-3592. The examiner can normally be reached on Monday - Friday 8:00am to 5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/  
Primary Examiner, Art Unit 1793

DJL